

Probing the Solar Corona with Radio Ranging Measurements

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An asymmetry in the radial variation of electron density above the east and west limbs of the Sun was inferred from centimeter wavelength ranging measurements conducted by Voyager 2 during its 1985 solar conjunction (Anderson et al., ApJ Lett., 323, L141, 1987). The Voyager 2 ranging measurements, that took place in the heliocentric distance range of 7-40 R_{\odot} , are compared with the Mauna Loa Solar Observatory white-light coronagraph measurements of the underlying corona. It is shown that the disparity in radial profiles is caused by the longitudinal variations stemming from the probing of significantly different source regions.

The results of this paper reinforce the notion that, the high precision and high sensitivity features of ranging measurements are more fully exploited when investigating the variation of density across low-contrast ray-like structures in the corona, rather than determining radial density profiles. An improved understanding of the relationship between the corona probing abilities of ranging and white-light measurements is obtained, and this is also summarized.

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